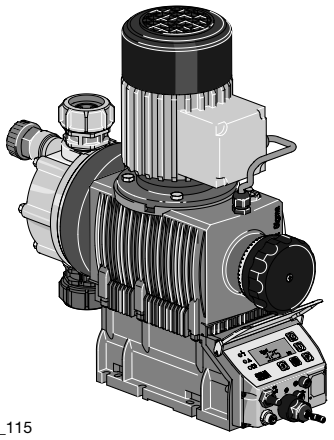
2.3 ProMinent® Sigma/ 2 Diaphragm Metering Pumps

2.3.1 ProMinent® Sigma/ 2 Diaphragm Metering Pumps



pk_2_115

The ProMinent® Sigma/ 2 diaphragm metering pump has a high strength metal-lined housing for those components subject to load, and an additional plastic housing to protect against corrosion. It has a capacity range of 50-420 l/h at a max. back pressure of 4-16 bar. The pump capacity is adjusted by varying the stroke length (5 mm) in 0.5 % steps via a self locking adjusting knob.

The reproducible metering accuracy is better than ±2 % providing installation has been correctly carried out, and in the stroke length range of 30-100 %. (instructions in the operating instructions manual must be followed.)

The stable, corrosion resistant metal and plastic housing is rated IP 65. To facilitate adaptation of the pumps to the widest possible range of processing requirements we offer a choice of three gearbox ratios, three liquid end sizes, two liquid end materials and either contact or analogue signal (e.g. 0/4-20 mA) control options in the form of the S2Ca Sigma controller.

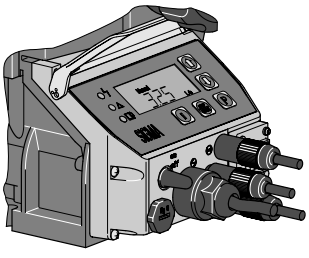
For safety reasons, all motor driven metering pumps must be equipped with adequate protection against electrical overload.

ProMinent® Sigma Basic Type (S2Ba)

The ProMinent® Sigma Basic type is a motor driven metering pump with no internal electronic control system. The ProMinent® S2Ba offers a variety of different drive options in both the three phase standard motor (standard: IP 55) or the single phase AC versions. We also supply metering pumps with ATEX-approval for use in EXe and EXde zones.

Different flanges are always available so that customers can use their own motor to drive the pump.

ProMinent® Sigma Control Type (S2Ca)



ProMinent® Sigma Controller
pk_2_104

The ProMinent® Sigma microprocessor version (standard IP 65) allows rapid and reliable adjustment to fluctuating metering requirements.

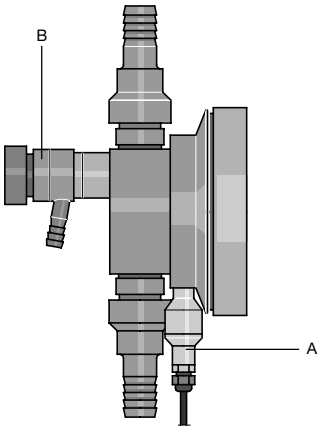
The controller has the same control panel as the ProMinent® gamma/ L metering pump.

The microprocessor controller of the Sigma pumps, featuring the optimum combination of variable AC frequency combined with digital stroking frequency, ensures exact metering even in the lower minimum range due to individual stroke control.

The individual pump functions are simply adjusted using the five programming keys. A backlit LCD indicates the current operating status, LEDs function as operation or fault indicators and fault indicator or pacing relays monitor the pump function.

PROFIBUS® Central or decentral adjustment is possible with PROFIBUS® and/or an integrated process timer.

Diaphragm Failure Indication (A)



pk_2_003

The liquid end may be supplied with an optional safety diaphragm.

A plastic chemical resistant end disc separates the drive housing from the liquid section, and protects the drive against corrosion in case of diaphragm rupture. The new diaphragm rupture system means that the liquid section is hermetically sealed in the event of diaphragm rupture. This has the great advantage that the feed chemicals cannot escape from the pump. In association with the S2Ca, diaphragm rupture is simultaneously indicated via the LCD. At this point it is possible to opt for continuation of the metering, or to stop the metering pump.

Integrated Relief-/Bleed Valve (B)

A liquid end variant with integrated hydraulic relief valve is optionally available for pressure ratings 4, 7, 10 and 16 bar. It protects the pump against overload and potential damage with no additional installation. This represents a considerable saving to the operator.

The integrated pressure relief valve offers the further advantage of effective bleeding of the injection valve during intake.

2.3 ProMinent® Sigma/ 2 Diaphragm Metering Pumps

Technical Data

	at 50 Hz				at 60 Hz						
	Pump Capacity at Max. Back Pressure			Max. Stroke Freq.	Pump Capacity at Max. Back Pressure		Stroking rate at max. back-pressure	Suction Lift	Adm. Priming Pressure Suction Side	Connector Suction/ Discharge Side	Shipping Weight
Pump type Sigma HM	**bar**	**l/h**	**ml/ stroke**	**strokes/ min.**	**psi**	**l/h/gph**	**strokes/ min.**	**mWG**	**bar**	**G-DN**	**kg**
16050 PVT	10	50	11.4	73	145	60/ 15.9	87	7	3	1 - 15	15
16050 SST	16	48	11.4	73	232	57/ 15.2	87	7	3	1 - 15	20
16090 PVT	10	90	11.4	132	145	108/ 28.5	156	7	3	1 - 15	15
16090 SST	16	86	11.4	132	232	103/ 27	156	7	3	1 - 15	20
16130 PVT	10	130	10.9	198	145	156/ 41	232	7	3	1 - 15	15
16130 SST	16	125	10.9	198	232	150/ 39.6	232	7	3	1 - 15	20
07120 PVT	7	120	27.4	73	100	144/ 38	87	5	1	1 1/2 - 25/20*	16
07120 SST	7	120	27.4	73	100	144/ 38	87	5	1	1 1/2 - 25/20*	24
07220 PVT	7	220	27.7	132	100	264/ 69.7	156	5	1	1 1/2 - 25/20*	16
07220 SST	7	220	27.7	132	100	264/ 69.7	156	5	1	1 1/2 - 25/20*	24
04350 PVT	4	350	29.4	198	58	420/111	232	5	1	1 1/2 - 25/20*	16
04350 SST	4	350	29.4	198	58	420/111	232	5	1	1 1/2 - 25/20*	24

*** Note:** Sigma types 07120, 07220 and 04350 liquid ends are fitted with DN 25 (G 1 1/2) valves. Since DN 20 is normally large enough for these versions (see technical data, connector suction/discharge line), the connector parts identified in the identity code (e.g. inserts) are already reduced to DN 20, i.e. customers can order standard DN 20 pipe and accessories. For the S2Ca pump types the 60 capacity data (since internal 60 Hz operation) applies, however, max. 200 strokes/min.

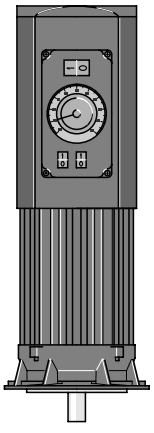
Materials In Contact With Chemicals

Liquid End	Suction/Discharge connector	Valve	Seals/ ball seat	Balls	Integrated Pressure Relief Valve
PVT	PVDF (Polyvinylidenefluoride)	PVDF (Polyvinylidenefluoride)	PTFE/PTFE	Ceramic/Glass*	PVDF/FPM
SST	Stainless steel no. 1.4571/1.4404	Stainless steel no. 1.4581	PTFE/PTFE	Stainless steel no. 1.4401	Stainless steel/FPM

*at 07120, 07220, 04350.

FPM = Fluorine Rubber

Sigma Basic Type Control Functions (S2Ba)



pk_2_103

Stroke length actuator/controller

Actuator for automatic stroke length adjustment, actuating period approx. 1 sec for 1 % stroke length, 1 K response signal potentiometer, enclosure rating IP 54.

Controller consists of actuator with servomotor and integrated servo control for stroke length adjustment via a standard signal. Standard signal input 0/4-20 mA, corresponds to stroke length 0 - 100 %. Automatic/manual operation selection key for manual stroke adjustment. Mechanical status display of actual stroke length value output 0/4-20 mA for remote display.

Variable speed motors with integrated speed controller (identcode characteristic V)

Power supply 1 ph 230 V, 50/60 Hz, 0.37 kW (see 2.6.2)
External control with 0/4-20 mA (see pk_2_103)

Speed controllers in metal housing (identcode characteristic Z)

(See 2.6.2).

The speed controller assembly consists of a speed controller and a 0.37 kW variable speed motor (see also 2.6.2)

2.3 ProMinent® Sigma/ 2 Diaphragm Metering Pumps

2.3.3 Identcode Ordering System Control Type (S2Ca)

S2Ca **Sigma Control Type (S2Ca)**

HM Main drive, diaphragm

Pump typ: (figures 1+2 =back pressure [bar],figures 3-5 =feed rate [l/h])

16050*	16 bar; 60 l/h	07120*	7 bar; 144 l/h	Notice: S2Ca pump types: 60 Hz performance
16090*	16 bar; 108 l/h	07220*	7 bar; 264 l/h	data applies (as 60 Hz operation)
16130*	16 bar; 130 l/h	04350*	4 bar; 350 l/h	but max. 200 strokes/min.
				* for PVDF versions,max.10 bar

Liquid end materials:

PV PVDF
SS Stainless steel

Seal material:

T PTFE seal

Positive displacement element:

0 Standard diaphragm
1 Double diaphragm with rupture indicator incorporating “Pump stopping” function
2 Double diaphragm with rupture indicator incorporating “Pump alarm” function

Liquid end version:

0 No springs
1 With 2 valve springs,Hastelloy C4,0.1 bar
4 With relief valve, FPM seal, no valve spring
5 With relief valve, FPM seal, with valve spring

Hydraulic connection:

0 Standard threaded connector (according to technical data)
1 Union nut and PVC insert
2 Union nut and PP insert
3 Union nut and PVDF insert
4 Union nut and stainless steel insert
7 Union nut and PVDF hose nozzle
8 Union nut and stainless steel hose nozzle

Version:

0 With ProMinent® logo
1 Without ProMinent® logo

Electrical power supply:

U 1 ph 100-230 V ±10 %, 50/60 Hz

Cable and plug:

A 2 m European
B 2 m Swiss
C 2 m Australian
D 2 m USA

Relays:

0 No relay
1 With fault indicating relay (normally energised) 1x changeover 230V – 2A
3 With fault indicating relay (normally de-energised) 1x changeover 230V – 2A
4 As 1 with pacing relay 2x normally open 24 V – 100 mA
5 As 3 with pacing relay 2x normally open 24 V – 100 mA
A shut-off and warning relays normally closed 2x normally open 24 V – 100 mA
C as 1 + 4-20mA output = stroke length x rate 1x normally open 24 V – 100 mA
F Power relay normally closed 1 x changeover 230 V – 8 A

Control variant:

0 Manual + external with pulse control
1 Manual external + pulse control + analogue
4 As 0 + process-timer
5 As 1 + process-timer
P As 1 + PROFIBUS® DP-interface, D sub 9
R As 1 + PROFIBUS® DP-interface, M12
With the PROFIBUS® option, no relay can be selected

Access code:

0 No access code
1 With access code

Metering monitor:

0 Input with pulse evaluation

Stroke length adjustment:

0 Manual
C Manual + calibration

S2Ca	HM	07120	PV	T	0	0	0	0	U	A	0	0	0	0	0

FPM = Fluorine Rubber

2.3 ProMinent® Sigma/ 2 Diaphragm Metering Pumps

2.3.4 Spare Parts Kits

The spare part kit generally includes liquid end consumables.

Scope of delivery in the case of PVT Versions

1 pump diaphragm
1 suction valve set
1 discharge valve set
2 valve balls
1 set of seals
(jacket rings, ball seat discs, ball seat housings)

Scope of delivery in the case of SST Version

1 pump diaphragm
2 valve balls
1 set of seals
(jacket rings, ball seat discs)

Spare parts kits Sigma/ 2

(Applies to identcode: Type 16050, 16090, 16130, 12050, 12090, 12130)		Order No.
Liquid end FM 130 - DN 15	PVT	740324
	SST	740326
	SST (with 2 valve sets)	740328

(Applies to identcode: Type 07120, 07220, 04350)		Order No.
Liquid end FM 350 - DN 25	PVT	740325
	SST	740327
	SST (with 2 valve sets)	740329

Dosing diaphragms

		Order No.
Sigma with **FM 130**	identcode: Type 12050, 12090, 12130	792495
FM 350	identcode: Type 07120, 07220, 04350	792496

Motor Data S2Ba

Identcode characteristic		Power supply			Remarks
S	3 ph, IP 55	220-240 V/380-420 V	50 Hz	0.25 kW	
		250-280 V/440-480 V	60 Hz	0.25 kW	
M	1 ph AC, IP 55	230 V ±5 %	50/60 Hz	0.18 kW	
N	1 ph AC, IP 55	115 V ±5 %	60 Hz	0.18 kW	
L1	3 ph, II2GEExeIIT3	220-240 V/380-420 V	50 Hz	0.18 kW	
L2	3 ph, II2GEExdIICT4	220-240 V/380-420 V	50 Hz	0.18 kW	with PTC thermistor, speed adjustment range 1:5
P1	3 ph, II2GEExeIIT3	250-280 V/440-480 V	60 Hz	0.18 kW	
P2	3 ph, II2GEExdIICT4	250-280 V/440-480 V	60 Hz	0.21 kW	with PTC thermistor, speed adjustment range 1:5
R	3 ph, IP 55	230 V/400 V	50/60 Hz	0.37 kW	with PTC thermistor, speed adjustment range 1:20 with external fan 1 ph 230 V; 50/60 Hz
V0	1 ph, IP 55	230 V ±5 %	50/60 Hz	0.37 kW	variable speed motor with integrated frequency converter

For further information you can request motor data sheets. Custom motors and/or custom motor flanges are available on request.

Notice for use in Ex-zone:

After 01.07.2003, only pumps with the corresponding EC-Ex-RL 94/9 code can be used in explosion-threatened operating areas. The explosion group, category and enclosure rating indicated in the identification shall comply with or exceed the conditions in the intended place of use.